

51. A computer system for the concurrent entry and processing of code, and comprising

a console having keys for entry of successive characters constituting said code,

a memory storing a buffer for holding said code, a code processor program consisting of a sequence of machine instructions, an interrupt service routine at a predetermined memory address, and a stack,

a central processing unit for executing said code processor program instructions and having an interrupt input, a program counter for storing the memory address of the next instruction to be executed by the central processing unit, and means immediately responsive to activation of the interrupt input to push the contents of the program counter onto said stack and to load into said program counter said memory address of the interrupt service routine,

means to cause the central processing unit to execute said code processor program instructions whereby the code processor program thereafter continuously maintains control of the central processing unit, except during interrupts, so as to process the code concurrently as the code is being entered into the system,

means responsive to striking one of said keys to activate

said interrupt input whereby the contents of the program counter are pushed onto the stack and the memory address of the interrupt service routine is loaded into the program counter thereby immediately passing control of the central processing unit to the interrupt service routine, whereupon the code processor program is interrupted immediately upon completing the machine instruction which it was executing when the key was struck,

said interrupt service routine including an editor program for inserting into said buffer a character code corresponding to said struck key, and having a return instruction at the end thereof,

said central processing unit having means responsive to execution of said return instruction to pop from the stack into the program counter the memory address of the code processor program instruction immediately following the instruction interrupted by striking said key, whereby the code processor program continues processing said character codes at the location in the buffer where the code processor program was interrupted.

52. A computer system as recited in Claim 51 wherein said character codes constitute a program of computer instructions in a high-level language and said processor program consists of a compiler comprising

a scanner for lexical analysis of the character codes in the buffer and for recognizing proper sequences of said character codes as identifiers or other forms of valid tokens in said high-level language and for forming a sequence of said valid tokens,

a parser for syntactically analyzing the grammatical structure of said sequence of tokens and for determining whether the grammatical structure conforms to predetermined rules of grammar of said high-level language,

a semantic analyzer for determining whether said sequence of tokens conforms to the semantic rules of said high-level language,

a code generator for translating the high-level language of said sequence of tokens into a sequence of computer instructions in a low-level language and capable of being assembled, linked or executed by a computer,

means for emitting an error message in the event that the sequence of character codes violates any lexical, syntactic or semantic rule of said high-level language, and

means for storing said sequence of low-level language computer instructions in a disk file.

53. A computer system for the concurrent entry and compilation of a computer program written in a high-level programming language, and comprising

a console having keys for entry of successive characters constituting the source code of said high-level language computer program,

a memory storing a buffer for holding said source code, a compiler, and an interrupt service routine,

said compiler comprising a scanner for lexical analysis of the source code characters in the buffer and for recognizing proper sequences of said characters as identifiers or other forms of valid tokens and for forming a sequence of said valid tokens,

said compiler further comprising a parser for syntactically analyzing the grammatical structure of said sequence of tokens and for determining whether the grammatical structure conforms to predetermined rules of grammar of said high-level language,

said compiler further comprising a semantic analyzer for determining whether said sequence of tokens conforms to the semantic rules of said high-level language,

said compiler further comprising a code generator for translating the high-level language of said sequence of tokens into a sequence of computer instructions in a low-level language

and capable of being assembled, linked or executed by a computer,

said compiler further comprising means for emitting an error message in the event that the sequence of source code characters violates any lexical, syntactic or semantic rule of said high-level language,

a central processing unit for executing said compiler whereby the latter maintains control of the central processing unit continuously, except during interrupts, so as to compile the source code concurrently as the source code is being entered into the system at the console,

means responsive to striking one of said keys to interrupt execution of the compiler by the central processing unit and thereby immediately pass control thereof to the interrupt service routine and to identify the location in the buffer at which the compiler was processing the source code when the interrupt occurred,

said interrupt service routine including an editor program for inserting into said buffer a character code corresponding to the struck key, and

means for returning control of the central processing unit back to the compiler immediately after insertion of the character code into the buffer and for causing the compiler to resume compilation at said buffer location at which the compiler was interrupted.

54. A computer system for the concurrent entry and processing of code, and comprising

a console having keys for entry of successive characters constituting said code,

a memory storing a buffer for holding said code, a code processor program, and an interrupt service routine,

a central processing unit for executing said code processor program and having an interrupt input, and means responsive to activation of the interrupt input to call said interrupt service routine,

means to cause the central processing unit to execute said code processor program instructions whereby the code processor program thereafter continuously maintains control of the central processing unit, except during interrupts, so as to process the code concurrently as the code is being entered into the system,

means responsive to striking one of said keys to activate said interrupt input to interrupt the code processor program and pass control of the central processing unit to the interrupt service routine,

said interrupt service routine including an editor

program for inserting into said buffer a character code corresponding to said struck key, and

means thereafter to return control of the central processing unit to the code processor program to enable the latter to resume processing said character codes at the location in the buffer where the code processor program was interrupted.

55. A computer system as recited in Claim 54 wherein said code processor program consists of a compiler comprising

a scanner for lexical analysis of the source code characters in the buffer and for grouping said characters into a sequence of tokens,

a parser for syntactically analyzing the grammatical structure of said sequence of tokens,

a semantic analyzer for determining whether said sequence of tokens conforms to predetermined semantic rules,

a code generator for translating said sequence of tokens into a sequence of computer instructions, and

means for emitting an error message in the event that the sequence of source code characters violates any one of a predetermined set of lexical, syntactic or semantic rules.

56. A computer system for the concurrent entry and processing of code, and comprising

a console having keys for entry of successive characters constituting said code,

a memory storing a buffer for holding said code, an editor program and a code processor program,

a central processing unit,

means to maintain control of the central processing unit by said code processor program except when a key is struck whereby the code processor program thereafter processes the code concurrently as the code is being entered into the system,

means responsive to striking one of said keys to pass control of the central processing unit to the editor program for inserting into said buffer a character code corresponding to said struck key, and

means thereafter to return control of the central processing unit to the code processor program to enable the latter to resume processing the code.